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Intangible investments at multinational companies' manufacturing subsidiaries: do they promote innovation-based upgrading?

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Abstract
Research background: Despite a widely acknowledged importance of intangible capital as the main driver of value creation, papers discussing corporate intangible investments tend to focus only on multinational companies, i.e. on headquarters (HQ). There are few papers scrutinising the specific attributes of intangible investments at manufacturing subsidiary level. This is, however, an important topic to investigate, since intangible investments can boost subsidiary upgrading. Intangible investments contribute to subsidiaries' acquiring capabilities that allow them to enhance the scope of their responsibilities and specialise in increasingly high-value activities.
Purpose: The purpose of this paper is to explore the features of intangible investment at MNCs' manufacturing subsidiaries, on the example of Hungary. Research questions addressed are as follows.
a) What exactly do local manufacturing subsidiaries invest in, when they implement intangible investments?
b) Is there a difference between the role of intangible investments at MNC level and at manufacturing subsidiary level?
c) What is the association between subsidiary-level intangible investments and upgrading?
Methodology: We analyse a sample of 44 manufacturing subsidiaries in the Hungarian automotive and electronics industries. We carry out a qualitative content analysis of sample companies' notes to their financial statements, complemented with other sources of corporate information.

Findings: We find that intangible investments are aligned with subsidiaries' functional specialisation: with operations. Their main role is to contribute to subsidiaries' absorption of the headquarters' technology transfer and enhance the productivity of the local core activities. This is sharply different from their traditional, MNC-level role: support to non-price competitiveness. We find support for the argument that subsidiary-level intangible investments and subsidiary upgrading are associated in a self-reinforcing virtuous circle.

Introduction

Both conceptual and empirical research has demonstrated that it is not fixed capital accumulated through 'brick-and-mortar' investments that can be considered the main driver of value creation but rather intangible capital, accumulated through investment in activities such as research and development (R&D), training, brand building, firm-specific software development, and so forth (Griliches, 1979, pp. 92–116; Hand & Lev, 2003; Ilmakunnas & Piekkola, 2014, pp. 443–456).

While there is a wealth of contributions on intangible investment in advanced economies both at the macro (e.g. Corrado *et al*., 2009) and the micro-level (Marrocu *et al*., 2013, pp. 377–402; O'Mahony & Vecchi, 2009, pp. 35–44), there are relatively few papers scrutinising the specific attributes of intangible investment in EU newer member states (EU13) (Jurajda & Stančik, 2013, pp. 85–110; Verbič & Polanec, 2014, pp. 67–85; Drenkovska & Redek, 2015, pp. 25–67). This is understandable, since the key actors in these countries are local subsidiaries of multinational companies[1] (MNCs) whose owners, the orchestrators of global value chains receive due attention in advanced economy focussed studies. Conversely, the intangible investment activity of local, domestic-owned small- and medium-sized enterprises (SMEs) is discussed indirectly in the entrepreneurship and SME-specific scholarship (e.g. Ács *et al*., 2015)

Zooming in on MNC subsidiaries in EU13 and investigating whether and what kind of intangible investment they implement locally is nevertheless an important issue to conduct research on, when scrutinising the features and the perspectives of their upgrading.

Intangible investments are expected to propel a virtuous circle in subsidiary development. They contribute to subsidiaries' acquiring capabilities that allow them to enhance the scope of their responsibilities and specialise

[1] For example, in Hungary, in 2012, the share of foreign controlled enterprises in manufacturing value added was 66%; in manufacturing employment: 47.7% and in (manufacturing) gross fixed capital formation: 78.3% (Source: Hungarian Central Statistical Office). According to Eurostat data, foreign controlled enterprises accounted for the lion's share of intramural R&D expenses (62.6%, in 2011).

in increasingly high-value activities. Thus, intangible investments may intensify subsidiaries' ongoing upgrading processes. Surveying the features and the impact of subsidiary-level intangible investments is therefore expected to give rise to valuable lessons for both policy-makers and practitioners.

The purpose of this paper is to explore aspects of intangible investment at MNCs' manufacturing subsidiaries in EU13, on the example of Hungary. The specific research questions to be addressed are as follows.

- What exactly do local manufacturing subsidiaries invest in, when they implement intangible investments?
- Is there a difference between the role of intangible investments at MNC level and at manufacturing subsidiary level?
- What is the association between subsidiary-level intangible investments and upgrading?

Empirical investigation is based on the analysis of a sample of 44 manufacturing subsidiaries of automotive and electronics MNCs in Hungary. Evidence is derived from qualitative content analysis of sample companies' notes to the financial statement.

The rest of this paper is organised in five sections. Section 2 provides a brief overview of the conceptual background. The research method and the sample are introduced in section 3. Section 4 presents the results of our investigations. Section 5 discusses the results and elaborates on policy implications. Section 6 presents some concluding remarks and details some limitations of the research.

Conceptual background

We define intangible investments as expenditures made in expectation of future returns in order to expand firms' stock of competencies (OECD, 2013) and to accumulate their stock of intellectual property. Accordingly, on one hand, intangible investments encompass investments in firms' business, technological, creative and organisational competencies: e.g. in firm-specific human capital, in organisational practices, in the company's reputation, brand equity and business network. On the other hand, investments in firm-specific information system solutions and databases, and in R&D and design-specific intellectual property rights augment firms' stock of intellectual property.

Firms' intangible capital stock can be accumulated through items purchased from specialised services providers. Moreover, intangible capital can also be created by the management, the ICT and the marketing staff,

and by researchers who dedicate part of their working time to generating firm-specific intangible capital.

Within the scholarship discussing the role of intangibles, the most relevant strand for our investigation comprises papers that analyse the impact of intangible investments on corporate performance (see survey by Denicolai *et al*., 2015, pp. 219–236). In a resource-based view of the firm (Barney 1991, pp. 99–120), the point of departure of these papers is that in contrast to tangible assets, intangible assets are rare, hard-to-imitate and non-substitutable, and they are, therefore, the main explanatory factors of corporate competitiveness. Intangible assets enhance firm performance not only through supporting both their core and support activities, but they also contribute to a better appropriation of competitive advantage (Denicolai *et al*., 2015, pp. 219–236): they foster *not only value creation but also value capture*. In summary, intangible investments enhance companies' non-price competitiveness (OECD, 2013).

Panel data investigations (e.g. Marrocu *et al*., 2012, pp. 377–402; O'Mahony & Vecchi 2009, pp. 35–44) found a positive association between firm's intangible capital stock and their productivity performance. Intangible capital is found to be strongly related to firms' innovativeness (Haskel *et al*., 2012). Most papers emphasise that intangible investments are associated not only with technological innovations but also with non-technological ones (e.g. Corrado *et al*., 2013, pp. 261–286; or in an EU13 context: Makó *et al*., 2012, pp. 116–137), i.e. with improved support processes (such as procurement, logistics or customer relationship management), improved organisational procedures (such as supply chain management, quality management, lean production), and improved work practices (decentralisation, new incentive systems, planned learning schemes).

The identified positive associations also hold in a dynamic perspective: as Arrighetti *et al*. (2014, pp. 202–213) outlined, the propensity to invest in intangible assets increases with firms' size, human capital, and historical intangible asset base.

At manufacturing subsidiary level, investment in intangible assets is closely interconnected with upgrading. The conjecture that intangible assets enhance firms' capabilities necessary for upgrading originates in Hall (1993, pp. 607–618) pioneering work on the role of intangible resources as determinants of firms' competitive advantage. Hall (1993) distinguishes between (intangible) *assets* and *competencies*, and develops a framework to demonstrate the association of the two categories. In his framework, investments in intangible assets contribute to the development of functional and organisational capabilities that are indispensable for sustaining/enhancing competitive advantage. Accordingly, the accumulation of

subsidiary-level intangible assets will reinforce subsidiary-level functional capabilities, and will thus contribute to subsidiaries' taking up more complex, higher value adding tasks than before.

Subsidiaries are found to coevolve with their mother companies (Madhok & Liu, 2006, pp. 1–21). In line with MNCs' sustained transfer of intangible assets, subsidiaries undergo a steady and extended competence development process. This facilitates their upgrading (Harding & Javorcik, 2012, pp. 964–980).

The relation between intangible investments and upgrading is not unidirectional: upgrading is both *preceded* and *accompanied* by investments in intangible assets, and intangible investments pave the way for subsidiaries' further upgrading. This self-reinforcing virtuous circle is conspicuously manifested at MNCs' subsidiaries. They are found to have superior performance than domestic companies already in the first years of their operation, because they can leverage their owners' intangible assets, such as firm-specific production system, organisational assets, technological knowledge, information system, etc. (see e.g. survey by Mudambi & Navarra 2004, pp. 385–406). With the run-up of production and the extension of local responsibilities, subsidiaries persistently receive additional intangible transfers. Moreover, subsidiaries also build intangible assets themselves and develop new capabilities (Kafouros & Aliyev 2016, pp. 580–607).

In summary, the relevance of intangibles for both corporate performance and upgrading is confirmed across a number of studies, also in the context of MNC subsidiaries operating in transition economies. However, to our knowledge, no empirical research exists investigating whether intangible investments in MNCs' manufacturing subsidiaries exhibit any specific features.

In the light of the above-detailed findings of the literature, we make the following propositions.

In a subsidiary perspective, intangible investments have a triple role. First, they reinforce subsidiary-level competences and contribute to subsidiaries' absorption of the headquarters' technology transfer. Intangible investments thus complement the tangible ones: they improve the effectiveness of subsidiaries' use of the transferred resources. Second, they foster subsidiaries' integration in the MNC's organisation through mitigating intra-MNC differences in organisational culture and creating a culture of trust and collaboration between the MNCs' entities. Third, they support subsidiaries' taking up more complex and higher value adding tasks than before: they support subsidiaries' upgrading.[2]

[2] We define upgrading as creating larger-than-before value added by taking up wider-

Furthermore, we propose that the attributes and targets of intangible investments differ across the various business entities of the MNC's organisation. Intangible investments are aligned with the functional specialisation of the given business unit. Consequently, at manufacturing subsidiary level, they are mainly associated with operations, while at the MNC-level their main role is to support headquarters-type activities and contribute to overall non-price competitiveness.

On the other hand, as intangible investments are closely associated with upgrading, they are indispensable for subsidiaries' coevolution with parent companies. Accordingly, above and beyond fostering process upgrading by supporting effective process implementation and seamless technology absorption, they are also related to subsidiaries' functional upgrading, as they allow them to acquire capabilities necessary to enhance the scope of their responsibilities and specialise in increasingly high-value activities.

Research sample and method

Drawing on Arrighetti *et al*.'s (2014, pp. 202–213) results who found that Italian firms' propensity to invest in intangible assets exhibits a quasi Pareto distribution, with very few firms investing substantially and many firms investing nothing, this analysis focuses on an easy-to-delineate part of Hungarian firms that are expected to invest heavily in intangibles: on MNCs' large manufacturing subsidiaries in the automotive and electronics industries in Hungary.

We explored the features of intangible investments of MNCs' 25 automotive subsidiaries and 19 subsidiaries operating in the electronics industry, through a qualitative content analysis of sample companies' notes to the financial statement (NFSs) of 2013. NFSs contain explanations of and details about each item of companies' balance sheets and income statements. In their NFSs, companies provide information among others about their R&D investments and about the composition of their purchased intangible services (e.g. marketing services, contracted educational, training and/or R&D expenses, purchased management consultancy and ICT services, royalties and management fees, etc.).

This information was complemented with (1) data on the number of employees, and the number and share of white-collar workers in 2008 and in 2013; (2) other sources of information about intangible investments, and

ranging and more complex tasks than before (see Humphrey and Schmitz (2002, pp. 1017–1027) for a taxonomy of upgrading).

about the development of the subsidiaries' mandates (about their upgrading performance). In particular, we scrutinised information disclosed by the companies on their websites, annual reports, business reports and media releases. Moreover, we carried out a systematic web search in the case of each company in the sample, trying to find information e.g. newspaper articles, or case studies about the given company's intangible investment activities and functional upgrading performance.

Sample firms were large, foreign-owned companies (over 250 employees), operating for at least ten years in Hungary. They were selected from the 2014 list of TOP 500 Hungarian companies. They were selected on the basis of three criteria. First, they should be large, foreign-owned companies (over 250 employees), operating for at least ten years in Hungary. Second, they should specialise in manufacturing and have both blue-collar and white-collar employees (some companies had only white-collar employees and were therefore not included). Third, their industry affiliation should be clear to delineate: some large companies were excluded, because they had several manufacturing facilities in Hungary that pertained to more than one industry, and they disclosed only consolidated, group-level financial statements.

In 2013, total employment at sample companies was 67,990, which accounts for 36% of total employment in the two industries in Hungary (source: author's calculation based on sectoral data of the Central Statistical Office). Table 1 summarises some basic features of sample companies.

Results

Table 2 summarises the evolution of employment at the surveyed companies. Some of the companies in the sample were hit hard by the 2008–2010 global crisis, but by 2013 most of them recovered, and 75% of the sample even increased employment.

Overall, the number of employees in the sample increased by 13.3% between 2008 and 2013. This average increase masks some qualitative change, since the increase of white-collar (non-production) staff was even more spectacular: 36.2%, resulting in an increased share of white-collar employees in the total workforce.

The large absolute increase in the number of non-production workers (by 4,792) reflects, on one hand, functional upgrading (sample firms' undertaking additional support functions). On the other hand since these employees — in functions as diverse as general management, human resources management, R&D, communication, development of company-specific

information system, environmental management — dedicate a fraction of their working time to generating intangible capital, a substantial increase in their absolute number can be interpreted as intensified intangible investment.

This finding is reinforced by data on and descriptions of sample companies' purchased services in their NFSs.

The broad intangible investment categories reported by the companies in the sample do not display any specific properties: they are similar to those mentioned by any MNC business unit of any functional specialisation, in any country. One of the most frequently mentioned purposes of intangible investment was training and skill enhancement (32 companies). Another frequently mentioned item was the purchase of information technology (IT) services (21 companies). Environmental services (such as investment in environmental certification, in related consultancy, and in environmental information disclosure (e.g. in the preparation of subsidiary-level sustainability reports) represented another salient item in the list of purchased services or of own-account investments (one third of the sample). Two thirds of the sample (30 companies) declared expenses with respect to purchased consultancy services, including engineering, environmental, management and specialised technical services. Approximately half of the sample (21 companies) reported some kind of R&D activity and investment in innovation.[3] However, few companies[4] reported market-oriented intangible investments (such as investment in reputational assets, marketing, advertising or branding). This can be explained with the fact that intra-firm exports represent the dominant sales channel at the surveyed companies.

Except for the low occurrence of market-oriented intangible investments, these results do not suggest that intangible investments have any specific attributes at manufacturing subsidiaries (that would differentiate them from regional / corporate headquarters or from stand-alone companies). However, the accompanying detailed descriptions of intangible investments reveal a number of special features.

The details of investments in training and skill enhancement revealed that in addition to vocational training and apprenticeship programmes, hu-

[3] Note that this share is much higher than the Hungarian average of 32.5% (between 2010 and 2012) (Source: Eurostat news release: The proportion of innovative enterprises fell below 50% in the EU in 2010-2012. Retrieved form http://ec.europa.eu/eurostat /documents/2995521/6483064/9-21012015-BP-EN.pdf/ad7e4bf6-fc8f-459b-a47e-da1c90 43bf2e (28.03.2016)).

[4] Eight companies reported 'advertising' expenses, however, these expenses might have covered recruitment ads. The surveyed documents contained no sign of investment in branding. We identified some investment in (local) reputational assets, in the form of various corporate social responsibility actions.

man capital embodied firm-specific competencies are often accumulated through intra-MNC knowledge dissemination. MNCs have established practices for boosting internal knowledge flows, transferring corporate values, making subsidiaries internalise MNC-level business objectives, conveying and routinizing management practices developed at the headquarters.[5] Knowledge dissemination practices involve expenses that can be considered intangible investment. Above and beyond sending expatriates from the regional headquarters to the subsidiaries, we found that local experts (of the surveyed Hungarian firms) also offer technical assistance, for example launch management services, to partner manufacturing subsidiaries in the region. Travel costs can be considered intangible investment (in education and training) also if Hungarian managers travel to the headquarters' premises to participate in best practice sharing meetings. Moreover, rotation-specific costs also belong to the category of intangible investments in skill enhancement.

Some intangible investment items were at the intersection of human resources development and investment in organisational capital. Examples include investment in modern human resources management practices (e.g. new performance management practices, new incentive systems, employee involvement) and implementation of new work practices (across-function collaboration, self-governing teams, various employee engagement schemes).

Investment in training and skill enhancement was aligned with subsidiary upgrading. With the take-up of selected support functions, function-specific knowledge-transfers (transfers of desirable practices) complemented the previously dominantly technical assistance-specific ones. Furthermore, relatively more investment (coaching, knowledge sharing, best practice sharing, etc.) was performed to increase local executives' managerial abilities.[6]

The descriptions corresponding to investments in IT systems and solutions revealed that investments in information technology mostly aimed at supporting manufacturing activities. Manufacturing analytics solutions supported production planning and scheduling; defect analysis; equipment effectiveness management (control of equipment downtime), inventory management and real time energy management (control of energy use). Additional investments involved integrated quality assurance systems;

[5] Recall that there is robust empirical evidence (Bloom & Van Reenen, 2010) that management practices are strong explanatory factors of firms' productivity, profitability and growth performance.

[6] This information draws on the author's prior interviews (interviews were carried out with 14 firms).

software tools that allow for the simulation and optimisation of manufacturing processes and/or tools that perform manufacturing feasibility studies, validate production processes, create manufacturing reports, etc.

Investment in IT systems was aligned not only with subsidiaries' process upgrading, but also with functional upgrading. Subsidiaries that took up order processing, customer relationship management, or accounting functions invested in the relevant software packages or added new functionalities to existing software packages.

In contrast to these specific targets of subsidiary-level investment, examples of MNC-level IT-investments — as described in the parent companies' annual reports — included development or procurement of business information systems, business intelligence systems, e-procurement systems and so forth. One of the oft-mentioned MNC-level IT-investments was the integration of standalone, heterogeneous business unit-level applications and systems.

The descriptions of R&D and innovation-specific outlays also underscored that dominant part of these investments were manufacturing subsidiary specific. Recurrent items included intangible investments in manufacturing excellence, e.g. implementation of methods such as lean, six sigma, or kaizen; investment in related coaching and/or use of mother companies' related technical assistance.

Corporate information sources provided information about other R&D activities, such as tool development, process engineering, layout design, and various testing tasks (e.g. product quality testing, assembly line testing, prototype testing, materials testing). These activities necessitated both tangible and intangible investments: these latter targeted capability development, or involved collaboration with local universities, and/or procurement of activity-specific software. Other examples of intangible investment-intensive projects were the introduction of simulation technologies to support production scheduling and control, implementation of digital enterprise technologies for the optimisation of equipment utilisation, reduction of inventories and monitoring production real-time: again, these investments are all operations-related.

Table 3 summarises the features of intangible investments at the surveyed companies, together with their relevance for production capabilities, organisational integration and/or upgrading.

Overall, we found that tangible investments targeting process upgrading were increasingly interwoven with intangible ones. This development was driven partly by technological and business trends (ubiquitous computing, digitisation of manufacturing, necessity of leveraging data generated during the manufacturing process) and partly by the increased complexity of pro-

duction technologies. Both the deployment and the assimilation of new production equipment required considerable development of local engineering capabilities.

Moreover, since some of the new technological solutions led to the obsolescence of blue-collar workforce skills, they necessitated additional vocational training and competence development.

Our sample also included companies with researchers involved in R&D-activities that were not associated with local operations. Examples include product design, research on new materials, new product development, enterprise application development and various other group-wide R&D activities.

Finally, a puzzling item needs to be mentioned among the constituents of sample companies' purchased services. As mentioned previously, two thirds of the sample companies declared expenses with respect to purchased consultancy services. However, a non-negligible share of these expenses (in some case 30% of total purchased services) was paid to the headquarters as a compensation of 'management services'. The epithets referring to management services fees were variegated, including 'royalties'; 'fee for using the brand name'; fee of 'technical services', fee of 'customer relationship management' services, or fee of 'organisational services' provided by the headquarters. This suggests that part of the expenses listed under the heading of 'purchased services' only seemingly refers to intangible investment: in reality these items conceal mother companies' extracting the profit generated by the subsidiaries.

Discussion and policy implications

The detailed descriptions of sample companies' intangible investments make it clear that manufacturing subsidiary-level intangible investments have specific attributes that differ from intangible investments performed at the regional or corporate headquarters. Dominant majority of intangible investment items targets manufacturing subsidiaries' *operational capabilities*. These investments are made with the purpose to enhance subsidiary productivity and optimise the manufacturing process. Intangible investments contribute to subsidiaries' increasingly efficient assimilation and exploitation of the received transfers.

In this vein, intangible investments *complement* the tangible ones, since both types of investment are aimed at enhancing the productivity and the reliability of the local core (manufacturing) activities. Even R&D-specific own-account activities and purchased R&D services are no exception, at

least the activities with purposes of problem solving, testing, process development, implementation of new operations techniques and work practices. The purchase of engineering, technical and management services and the transfer of modern management practices and workplace practices can also be classified as local productivity enhancing intangible investments.

It can be concluded that intangible investments are aligned with subsidiaries' functional specialisation: with manufacturing (operations). This is sharply different from their traditional, MNC-level role. Traditionally and definition-wise, intangible investments are associated with headquarters-type activities (support of non-price competitiveness through investments in firms' business, technological, creative and organisational competencies and investment in firm-specific intellectual property). On the other hand, there is a consensus opinion that manufacturing subsidiaries are established to *exploit* parent companies' intangible capital (Buckley & Casson, 1976). Nevertheless, as we documented, this does not exclude the necessity of subsidiary-level intangible investments.

Altogether, we found close relation between upgrading and intangible investments.[7] Subsidiary-level intangible investments and subsidiary upgrading are associated in a self-reinforcing virtuous circle. Subsidiary-level intangible investments are indispensable for assimilating and effectively exploiting parent companies' transfers. Intangible investments mainly foster process innovation-based upgrading. However, in an industry 4.0 era (Kagermann *et al*., 2013) characterised by cyber-physical production systems (Monostori, 2015, pp. 766–776) process related development activities cannot be labelled as simple and routine problem-solving tasks requiring basic engineering capabilities: they rather necessitate high-level engineering and computing knowledge.

Consequently, above and beyond enhancing process-upgrading-related local capabilities, intangible investments may allow subsidiaries to specialise gradually in increasingly high-value support activities. The resulting local competence accumulation may eventually pave the way for local subsidiaries' engagement in increasingly sophisticated activities, including product development[8] and/or for subsidiaries' obtaining responsibilities

[7] The most conspicuous association is that the increase in the number of non-production workers can be used as a proxy of both intangible investment (it suggests increased own-account intangible investment) and upgrading: when subsidiary upgrading takes the form of undertaking wider and more complex support tasks than before, this can be operationalised with the increase in the number of non-production workers.

[8] Routine problem solving and other basic-level R&D tasks are often followed by more sophisticated R&D assignments (Sass & Szalavetz, 2014, pp. 153–180).

beyond local activities.[9] This, in turn, necessitates additional intangible investment.

Our findings have profound implications from the point of view of developing an intangible investment-driven catch-up strategy. An important question is whether policy-makers need to set up dedicated support schemes to boost foreign investors' intangible investment activity in host countries.

Consider on one hand that, as our results make it clear, parent companies accept the non-negligible expenses of intangible investments even without any public support, since these subsidiary-level investments are indispensable for the implementation of the MNC's business purposes.

On the other hand, policy measures that support selected intangible investment categories can enhance parent companies' local commitment. An important area is 'training and professional development'. For example, fiscal incentives for training programmes or the public co-financing of the costs of employees' language courses and of intra-MNC mobility programmes are well aligned with parent companies' efforts to improve local competences and subsidiaries' integration in the MNCs' organisation.

Public support to other intangible investment items may catalyse subsidiaries' specialisation in high-value-added business functions. Examples include the support of

- investment in the digitalisation of production, i.e. in cyber-physical systems;
- implementation of business analytics and decision support systems;
- purchase of design, management consulting and engineering services;
- launching / upgrading in-house R&D activities and investment in complementary research infrastructure;
- purchase of contract research services from local/domestic actors.

In exchange for public co-financing, the schemes can stipulate the use of domestic knowledge intensive business services (KIBS) suppliers. Although the surveyed sources of information did not reveal whether the KIBS purchased by the companies in the sample were bought from domestic or from foreign companies, country-level data suggest that Hungarian KIBS providers can more easily become suppliers of MNCs' local manufacturing

[9] For example, subsidiary-level tool development capabilities can be leveraged across partner subsidiaries. Similarly, subsidiary-level demonstrated process engineering, layout design or new product launch capabilities can be used in the framework of group-wide knowledge sharing activities, when subsidiaries offer technical assistance to each other. As a result, the hub-and-spoke pattern of intra-MNC intangible investment flows (from the headquarters to the subsidiaries) will gradually be transformed in a networked-type knowledge dissemination.

subsidiaries than parts and components manufacturers. According to the author's calculations based on OECD — WTO WIOD data, the lion's share of the parts and components used by Hungarian automotive and electronics companies as production inputs is imported.[10] Conversely, WIOD data show that in 2011, the value of KIBS inputs purchased by Hungarian automotive companies from domestic service providers equalled the value of KIBS purchased from abroad. In the electronics industry the expenses of KIBS purchased from Hungary-based providers were even by 50% higher than those of imported KIBS (author's calculations from WIOD data). Consequently, it is fair to claim that above and beyond upgrading and the increase in subsidiaries' total factor productivity, the main channel through which FDI-driven intangible investments have a positive impact on host countries' competitive performance is through subsidiaries' backward linkages.

Conclusions

Drawing on a proprietary database that contains details on manufacturing subsidiaries' intangible investment outlays, this research set out to investigate the features of subsidiary-level intangible investments in the Hungarian automotive and electronics industries. While prior research on intangible investments investigated either their association with corporate performance indicators, or developed methodologies for its measurement, the main purpose of this paper was to uncover the particularities of intangible investments at manufacturing subsidiary level. The analysis of the idiosyncratic features of these investments allows us to make propositions about the differences between the role of intangible investments at MNC level and at manufacturing subsidiary level, and also about the relation between intangible investments and upgrading.

We proposed and empirically documented that intangible investments are aligned with manufacturing subsidiaries' functional specialisation (operations). Above and beyond facilitating the effective implementation of

[10] The value of imported electronics inputs used by Hungarian electronics companies was USD 11,629 million in 2011: 126.7 times as much as the value of electronics inputs purchased from Hungary-based companies (USD 88 million) (source: author's calculations based on OECD – WTO WIOD data). The respective figure (imported automotive components over components purchased from Hungary-based producers) was 5.6 in the automotive industry. This relatively low dominance of imported inputs (at least compared to the data of the electronics industry) is explained by the high presence of foreign automotive suppliers that followed their foreign clients and established manufacturing facilities in Hungary to supply the clients' local manufacturing bases from a small geographic distance.

headquarters' assignments, intangible investments are also closely related to subsidiaries' upgrading: effective assignment implementation breeds further (deeper and more sophisticated) assignments. Subsidiaries undergo a steady and extended competence development process: they coevolve with their mother companies.

With this said, it is time to return to the question raised in the title of this paper. Do intangible investments promote innovation-based upgrading at manufacturing subsidiaries? At first sight it seems that through facilitating increasingly efficient resource utilisation and supporting subsidiaries' absorption and assimilation of novel technological solutions, intangible investments are confined to process innovation-based upgrading. In the broad view of innovation (see e.g. Mytelka & Smith, 2002, pp. 1467–1479) this certainly qualifies as innovation-based upgrading. In a dynamic perspective, however, there is more to manufacturing subsidiary-level intangible investments than process upgrading / process innovations and effective implementation of parent companies' assignments. With subsidiaries' persistent competence accumulation, coupled with global value chain orchestrators' increasing reliance on globally distributed knowledge, and with digital technologies transforming every business function, intangible investments open up new channels for manufacturing subsidiaries' innovation-based upgrading.

The present study is subject to certain limitations, which can be addressed by future research endeavours. A major limitation is related to the measurement difficulties of intangible investments. As it is well-known, some intangible investment items are considered 'current expenditure' and not 'investment', which prompted the chosen methodology of qualitative content analysis of firms' NFSs. Nevertheless, these qualitative results are hard to generalise.

Furthermore, our sample is very specific: it consists of large, foreign-owned companies whose intangible investment activity is probably much more intensive than the average. Furthermore, our investigation is limited to MNCs' Hungarian subsidiaries and it would be interesting to see if results are confirmed in other country contexts.

Another limitation to acknowledge is that two export-oriented industries were investigated. As parent companies' motivations to finance subsidiaries' intangible investment are influenced by industry-specific factors and by the given entities' role in the global value chain orchestrated by their MNC-owners, this limitation calls for further research that investigates firms' experiences in other industries and/or scrutinises the features of intangible investment in other types of firms, for example in domestic-market-oriented ones.

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Annex

Table 1. Sample companies, basic descriptive data

Number of companies (electronics / automotive)	19 / 25
Average sales (€ million, 2013)	471.7
Share of exports (%, 2013)	86.9
Average number of employees, 2013	1,545
Average number of years of operations in Hungary (in 2014)	19
Share of companies conducting R&D activities in 2013 (%)	47.7

Source: author's calculations from NFS data.

Table 2. Employment data at sample companies

Employment 2008 / 2013	59,986 / 67,990
White-collar (non-production) employees 2008 / 2013	13,225 / 18,017
Share of non-production employees (%, 2008)	22
Share of non-production employees (%, 2013)	26.5
Number of companies reducing employment between 2008 and 2013	11

Source: author's calculations from NFS data

Table 3. Features and contexts of intangible investments at the surveyed companies

Intangible investment	Production capability	Integration in the MNC's organisation	Subsidiary upgrading	Percent of subsidiaries investing*
Staff and management training	X	X	X	73
IT (software, system, applications, solutions)	X	X	X	48
Environmental services	X			34
Consultancy services (technical and management consultancy)	X	X	X	68
R&D (own-account and purchased)	X		X	48
Market-oriented intangible investments		X	X	18

* A caveat to consider is that there are no uniform standards in Hungary that would prescribe the details NFSs have to disclose. Most companies in our sample provided detailed accounts of the purchased services, but some of them disclosed only data on aggregate cost items. Although information from NFSs was complemented with information from web-based search, it is still not safe to maintain that no information on the implementation of selected intangible investment items denotes a lack of such activities.

Source: author's compilation from NFS data and from complementary information sources.